

What is claimed is:

1. A system for acquiring logging data, comprising:
 - a. a controller for causing the generation of a signal in a formation surrounding a wellbore, said controller having a first clock for time-stamping a record of said generated signal; and
 - b. at least one receiver deployed in the wellbore, said at least one receiver adapted for detecting said signal and having disposed therein an atomic clock synchronized with said first clock before deployment in said wellbore, wherein said receiver references said atomic clock in order to record a time-stamp associated with the detected signal.
2. The system of claim 1 wherein the atomic clock has a drift rate of less than 3 microseconds per day.
3. The system of claim 1 further comprising a thermal control system for maintaining at least one component of said atomic clock at a predetermined temperature.
4. The system of claim 3 wherein the thermal control system comprises a member of the set of: (i) a thermoelectric cooler; (ii) a sorption cooler; (iii) a sorption heater; (iv) a thermal isolator; (v) a resistance heater; (vi) a phase change heater; and (vii) a phase change cooler.
5. The system of claim 3 wherein the thermal control system comprises a sorption system, said sorption system including at least one hydrate material in thermal contact with the at least one component of said atomic clock.

6. The system of claim 3 wherein the at least one component includes a resonant chamber and a photo-detector.
7. The system of claim 3 wherein the at least one component is a light source.
8. The system of claim 1 wherein the atomic clock is based on an atomic transition
5 of at least one of the set of: (i) rubidium, (ii) cesium and (iii) hydrogen.
9. The system of claim 1 wherein the atomic clock is based on an atomic transition of rubidium.
10. The system of claim 1 wherein the signal is a seismic signal and the receiver is a seismic receiver.
- 10 11. The system of claim 1 wherein the receiver is a device deployed down the wellbore for receiving the signal while tripping a drill string out of the wellbore.
12. The system of claim 1 wherein the receiver is adapted to be integrally mounted in a drill string for receiving the signal while drilling.
13. An atomic clock for use in a wellbore, comprising;
- 15 a. a downhole tool for housing said atomic clock;
- b. a resonant chamber having a rubidium vapor therein;
- c. a light source for irradiating said rubidium vapor in said resonant chamber;
- d. a photo-detector engaged with said resonant chamber and adapted to receive light
from said resonant chamber; and
- 20 e. a first thermal control device engaged with said resonant chamber and said photo-detector to maintain said resonant chamber and said photo-detector at a first predetermined temperature.

14. The atomic clock of claim 13 further comprising a second thermal control device engaged with said light source and adapted to maintain said light source at a second predetermined temperature.
15. The atomic clock of claim 13 wherein the first thermal control device is at least
5 one of (i) a thermoelectric cooler; (ii) a sorption cooler; (iii) a sorption heater; (iv) a thermal isolator; (v) a resistance heater; (vi) a phase change heater; and (vii) a phase change cooler.
16. The atomic clock of claim 14 wherein the second thermal control device is at least
10 one of (i) a thermoelectric cooler; (ii) a sorption cooler; (iii) a sorption heater; (iv) a thermal isolator; (v) a resistance heater; (vi) a phase change heater; and (vii) a phase change cooler.
17. The atomic clock of claim 13 wherein the first thermal control device is a sorption device comprising at least one hydrate.
18. The atomic clock of claim 14 wherein the second thermal control device is a
15 sorption device comprising at least one hydrate.
19. A method for acquiring logging data comprising:
- a. providing a controller for causing the generation of a signal in a formation surrounding a wellbore;
 - b. providing a first clock in data communication with said controller;
 - 20 c. storing a record of said signal in a medium using said first clock to obtain a time-stamp relating to said generated seismic signal;
 - d. deploying a receiver in the wellbore for detecting said generated signal; and

- e. deploying an atomic clock in data communication with the receiver, said atomic clock suitable for providing a time-stamp to said receiver, said atomic clock being substantially synchronized with said first clock.
20. The method of claim 19 wherein the atomic clock has a drift rate of less than 3
5 microseconds per day.
21. The method of claim 19 wherein said atomic clock comprises a thermal control system for maintaining a component of said atomic clock at a predetermined temperature.
22. The method of claim 21 wherein the thermal control system comprises one of the set of: (i) a thermoelectric cooler; (ii) a sorption cooler; (iii) a sorption heater; (iv) a
10 thermal isolator; (v) a resistance heater; (vi) a phase change heater; and (vii) a phase change cooler.
23. The method of claim 21 wherein the thermal control system comprises a sorption device having a hydrate material, the method further comprising:
placing said hydrate material in thermal contact with said component of the
15 atomic clock.
24. The method of claim 19 wherein the atomic clock is based on an atomic transition of a member of the set of: (i) rubidium, (ii) cesium and (iii) hydrogen.
25. The method of claim 19 wherein the atomic clock is based on an atomic transition of rubidium.
- 20 26. The method of claim 19 wherein the receiver is a device deployed downhole and configured to receive the signal while tripping out of the wellbore.

27. The method of claim 19 wherein the receiver is adapted to be integrally mounted proximate a bottom end of a tubular member inserted in the wellbore.

28. The method of claim 19 wherein the signal is a seismic signal and the receiver is a
5 seismic receiver.